

# RainTube

## Beyond Green Initiative Essay

### Description

RainTube is a line of eco-sustainable corrugated pipe in sizes ranging from 2” to 48” in diameter. Our core product is 4” in diameter, porous, and made specifically to fit into rain gutters. All RainTube products are made from 100% post-consumer, recycled HDPE food containers such as milk jugs, juice bottles and grocery bags and are 100% recyclable and re-useable as raw material for new products. Each RainTube product is delivered to the consumer with a post-use recovery plan. Manufacturing uses 100% renewable energy, very small amounts of recycled water and produces no off-gassing or other by-products. RainTube is even shipped without packaging. To reduce the environmental impacts of transporting both raw and finished materials RainTube has developed a unique shipping strategy. Instead of distributing the finished product long distances from a single location, RainTube ships its lightweight product molds to partner factories that are more strategically located to the end users. Raw materials are then purchased from local recycling sources and the manufacturing takes place close to the market. This distribution strategy dramatically reduces product travel miles and minimizes the associated carbon footprint.

RainTube is designed and manufactured specifically for use in infrastructure applications to control, filter, collect, store and distribute rainwater. The objective is to provide products that protect structures from water damage and at the same time help conserve diminishing and valuable water resources for reuse or delivery back to the ground through infiltration. RainTube products help achieve such core sustainability goals as removing long-life plastic from landfills, improving structural durability and longevity, conserving and increasing fresh water resources, the reduction or elimination of wasteful, polluting storm water runoff and the minimization of structural maintenance and repair costs.

RainTube is an example of the benefits of re-examining existing building practices and technologies and putting them to work in new, powerful and innovative applications. Utilizing the same core machinery used to manufacture plastic drainage pipe, RainTube has invented new shapes, profiles, sizes, and raw material ingredient mixes to come up with products made specifically for new uses. For instance, when installed in rain gutters, RainTube prevents standard metal gutters from clogging and causing water damage to the rest of the structure. It also prevents the gutters from prematurely deteriorating by eliminating standing water and moisture-trapping debris. This is important because financial losses from water damage primarily caused by defective overflowing gutters, is very large. In addition, water that has been collected and filtered at the gutter level can now be stored and reused downstream for many other purposes including irrigation, toilet flushing, clothes washing and with proper purification, even cooking and drinking.

# RainTube Whole-Building Process

RainTube's contribution to a successful holistic project:

- **Accessible:** Maintaining the roof/gutter installation is critical for protecting the entire structure yet current design practices do not typically provide easy access to these important areas for service. Maintenance requires dangerous ladder work or ascending to the surface of the roof structure. RainTube improves accessibility by reducing or eliminating the need for difficult and dangerous roof/gutter maintenance.
- **Aesthetics:** RainTube enhances the appearance and completes the functional potential of rain gutters by creating a closed system that rejects clogging material but allows water to pass unimpeded. RainTube creates a flat, straight, barely visible yet attractive horizontal element and its black color falls in a shadow line between the top of the gutter and the lower edge of the roof material. RainTube's form, with the convex top surface alludes to the true functionality of the product since it is logical that debris would have difficulty collecting on a curved surface.
- **Cost-Effective:** RainTube provides value propositions on several levels including: maintenance cost reductions, improved durability, elimination of water damage repairs and replacements and extended gutter and roofing life. Simple design, easy installation and use of recycled materials keep RainTube's costs low making RainTube the least expensive professionally installed product in its category. At the same time its useful life is estimated to be more than 100 years. The combination of low cost and long design life produces a life cycle cost that is one the lowest of any building product available. RainTube is truly cost-effective and produces a high return on investment.
- **Functional/Operational:** Properly functioning gutters are an essential building component. Unfortunately, standard gutter designs are flawed in that they collect all manner of clogging debris. Gutters that clog, overflow, leak or hold standing water inflict most of the external water damage done to structures. The results range from flooding and foundation settlement to mold, dryrot and premature replacements of windows, trim and siding. In cold country gutters are easily torn off by snow and the weight of ice build-up. The RainTube solution fits snugly into the body of the gutter providing a porous filtering element which allows debris and snow to be easily shed while collecting water a high volumes. The RainTube material is impervious to natural elements like heat, cold, UV and acid rain and has a duty life of over 100 years. The minimal maintenance RainTube requires can be scheduled and performed safely and conveniently. RainTube transforms problematic gutters into useful, efficient tools for harvesting rain water. By eliminating clogs and overflows, RainTube increases the efficiency of water collection while eliminating water damage.
- **Historic Preservation:** Because RainTube has little if any visual impact it can be utilized in the reconstruction or restoration plans for virtually any historic structure. Sizes are available for all historic gutter shapes and sizes, even small wooden gutters. Most importantly,

historic structures fitted with RainTube can avoid many costs and preservation problems associated with water related damage and deterioration.

- **Productive:** RainTube may not directly contribute to the increased productivity of a structure's occupants but it can have a dramatic effect through indirect means. For instance, one client, a cardiac surgeon in Los Gatos California, had RainTube installed in his home after he had been incapacitated for months by fall injuries suffered from an earlier gutter cleaning attempt. Worry-free gutter are a psychological relief for many and being able to transit under eaves without a soaking is also a great convenience.
- **Secure/Safe:** In many areas where structures interface with wooded areas, fire is a grave concern. In January 2008 the California Department of Forestry (CDF) adopted new building codes for these "interface" developments. One of the new building codes requires the "installation and maintenance of gutter protection" to ensure the gutters remain free of flammable debris. RainTube meets and exceeds this new requirement by preventing the build-up of debris in the gutter and by providing ongoing maintenance services intended to keep the roof clear of debris also. Since the inception of this new code it has been widely adopted throughout the US.
- **Sustainable:** The sustainability ramifications of using RainTube are large both directly and indirectly. Directly RainTube removes hundreds of plastic food containers from the landfill on every job and at the end of its life it is infinitely recyclable into more RainTube or other products. Indirectly, RainTube contributes to the durability of the building by eliminating water damage from leaks and overflows. Increased durability means fewer replacements which are costly in both dollars and natural resources. In addition, gutters fitted with RainTube can now be used to collect rainwater for reuse. Large diameter RainTube (12"-36") can also be used to create mass underground water storage cisterns for water collection and storage. RainTube has been certified for sustainability at the gold tier by Cradle to Cradle. Cradle to Cradle assess the product for toxic composition, manufacturing water and energy use, packaging, shipping, and corporate strategies and policies on ethics and social responsibility.
- **Transferability and Marketability:** The RainTube concept is simple to understand and its simplicity makes it quickly and universally accepted by consumers. Installation is also easy to learn and perform making RainTube a desirable added service for existing contractors. RainTube can be manufactured regionally, close to the end markets by shipping universally adaptable molds to existing partner factories. These regional factories can then use raw materials acquired from local recycling plants further distributing the economic value of the product. Once RainTube is manufactured it can be delivered and installed through many existing service contractors including roofers, gutter contractors, landscapers and pest control providers thus providing additional service offerings and revenues from their same basic skills set and existing customer base. RainTube can also be utilized by the do-it-yourself market. Architects, designers and developers seeking cost effectiveness and functionality in an eco friendly package will want to specify RainTube as part of their normal rainwater control design as RainTube provides assistance in several LEEDS categories and directly provides points in six categories for the Earth Advantage green home certification program.

RainTube is a scalable product that can be transferred to, and satisfy economies of, a large market very quickly.

## Results and lessons learned

By taking time to gain a thorough understanding of the purpose and importance of rain gutters, then comparing that understanding with current designs and installation practices, opportunities for improvements became apparent. Opportunities developed not only for improving the functionality of gutters, but also in significantly improving the durability and sustainability of entire structures. Making gutters work better meant less damage to the home and more water under control and available for use thus expanding benefits to a larger audience. RainTube is no longer a product solely for helping to eliminate a dangerous and unpleasant maintenance job. It also extends the life of the home, improves the safety of its occupants, provides for efficient collecting and pre-filtering of rain water for reuse and helps to reduce landfill waste.

Goals and objectives for RainTube as far as design, effectiveness and sustainability have far surpassed expectations combining low cost with high effectiveness while removing an average of two hundred plastic milk containers from the landfill on every job. Marketing goals for RainTube include: 1) using innovation to become the market leader in the gutter protection industry, 2) enrolling architects and contractors to promote and install the product, and 3) educating property owners on the need for properly functioning gutters.

Although RainTube has yet to achieve the top position in sales for the gutter protection industry, it does hold the leadership spot in terms of innovation, price and eco-friendliness. Currently RainTube is the only product of its type that is a “green” product and is in fact one of the highest rated sustainable building products in the world according to MBDC’s Cradle to Cradle certification program and Green Building Pages product benchmarking system.

Enrolling contractors has proven to be a challenge. Methods and practices in the construction industry are slow to change and contractors are just as slow to adapt new product ideas. Architects though have been quick to spot the RainTube benefits and are beginning to incorporate it into their sustainable building designs.

Our most successful goal has been educating property owners who have long been plagued by the frustration and cost of gutters that don’t work and are longing for a solution. They quickly grasp the new functional concepts and appreciate the lessened impacts on both the environment and their pocketbooks. Currently too, there is a growing awareness of the value of collecting and reusing rainwater.

Designing RainTube around recycled HDPE created a low-cost, durable product that can be recycled many times with little degradation in quality. More importantly, it has removed plastic waste from our landfills where it would normally remain for thousands of years and put it to work protecting our homes, buildings and lives.